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## Gesture, non-verbal

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The expression non-verbal gesture originates in the distinction between two types of gestures in speech:

- The gesture that produces voice, i.e. the movements of the vocal channel, that produces auditory speech events;
- And the gesture that accompany the speech (face expression, hands movements, postural dynamics, etc...), that does not produce auditory speech event and that is considered as a part of the speech (speech is hence viewed as being composed of a gesture body part and of a gesture vocal part).

Speech has been generally thought of as conveying information in discrete linguistic-symbolic units, such as words and sentences representing linguistic meanings. Features as prosody, intonation, and more generally continuous evolutions, were not considered as an important way to convey information. Recently (since about the end of 80s, if we except the visionary introduction by Pierce [Pierce, 1932]), the role of “non-symbolic analog signs” has been re-introduced as a basic component of speech communication.

In [Hadas and al., 2006], analog signs are defined as follows: “*In contrast to symbolic signs, analog signs consist of non-digital continuous signals in which the pattern properties of the signal correspond in some way to the information conveyed by the signal. Examples for the use of this kind of analogical mapping between the intended message and pattern properties of the signal can be found in animal communication [...] as well as in the gestures that accompany speech*”.

The expression non-verbal gestures has then been introduced to name this type of analogous information when carried by ges-

ture. At the same time, similar developments could be observed in the domain of human-computer interfaces [Kurtenbach, 1990]. This co-evolution led to use the expression non-verbal gestures to regroup all the analogous information produced by humans gesture for human communication.

Hence, from its origin in speech communication, the expression non-verbal gestures has been extended to refer to all the free movements of the body (of the face, of the hand, of the whole body, etc...), except those that produce speech.

The expression, however, leads to some confusions.

A first limitation is that it presents all the gestures as being able to be classified in verbal and non-verbal gestures. So doing, first, it hides the fact that these two categories are actually sub-categories of the larger domain of symbolic communication [Goldin-Meadon, 1999], including digital and analogous signs. Examples of gestures that do not produce verbal events, but that are not symbolic signs, exist. An exemplary case is music. In Music and musical communication, the importance of the non-discrete analogous properties of the sounds have been usually widely considered, for ages, without calling it non-verbal communication.

More important, the main limitation of the expression is to pre-suppose that gestures only aims at communicating symbolic information, whereas there are other important categories of gesture that do not fall into the domain of symbolic communication, although they communicate information.

Other gestures, such as instrumental gestures in musical performance or interactive gestures in VR, are less considered by such dichotomy between verbal and non-verbal gestures. These types of gestures are useful means to produce sound expression, musical expression, instrumental communication, expression in movements and animation, and more generally to act on the world and to consequently produce analogous significant

transformations regarding the world. In fact, such gestures are similar to the vocal gestures, i.e. the physical gesture that produces auditory speech.

In conclusion, in terms of typology of gestures, and given the richness of gestures, especially in the lightening of Enaction that positions action at the centre of the interaction and communication activities, it is useful to clarify all the function of gestures. To that aim, Consequently, rather than classifying gestures into verbal and non-verbal, another more complete classification could be a classification that:

- First, distinguishes between the several macro-functions of gestures, for example between semiotic, epistemic and ergotic functions [→ Ergotic/epistemic/semiotic functions] as proposed by Cadoz [Cadoz, 1994] [Wanderley & Cadoz, 2000]. In the category of ergotic gestures, there are all the gestures energetically involved in the production process. The vocal gesture may belong to this category.
- And second, in the category of non-ergotic gestures, distinguishes between several sub-categories, amongst which there are the gestures that accompany the speech, but also all the recently-called non verbal gestures.

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